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AUTHOR Scott, Douglass J.
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ABSTRACT

This article presents a conceptual framework for the research and practice of educational computer conferences that shifts the focus from the on-line messages being exchanged to the participants' engagement with the conference. This framework, known as the "Iceberg Metaphor" or the "Michigan Model of educational telecommunications," maintains that on-line communication is similar to the tip of an iceberg, whereas a great deal of the conference participants' learning experience takes place off-line. This conceptual framework was used in a recent case study at the University of Michigan regarding preservice teachers' use of a computer conference. The Metaphor's implication for this study was to shift the focus of inquiry from the conference transcript to extensive interviews with the participants to better understand their overall engagement with the conference. A summary of this study and its major findings are presented. The final section of this article discusses the possible implications the Iceberg Metaphor and related research may have for the creation, implementation, and evaluation of international educational computer conferences. (Contains 15 references.) (Author)

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THE HUMAN DIMENSION OF COMPUTER-MEDIATED COMMUNICATIONS: IMPLICATIONS FOR INTERNATIONAL EDUCATIONAL COMPUTER CONFERENCES[1]

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Douglass J. Scott, Ph.D.
Assistant Professor
Michigan State University

Abstract

This article presents a conceptual framework for the research and practice of educational computer conferences that shifts the focus from the on-line messages being exchanged to the participants' engagement with the conference. This framework, known as the "Iceberg Metaphor" or the "Michigan Model of educational telecommunications," maintains that on-line communication is similar to the tip of an iceberg, whereas a great deal of the conference participants' learning experience takes place off-line. This conceptual framework was used in a recent case study at the University of Michigan regarding preservice teachers' use of a computer conference. The Metaphor's implication for this study was to shift the focus of inquiry from the conference transcript to extensive interviews with the participants to better understand their overall engagement with the conference. A summary of this study and its major findings are presented. The final section of this article discusses the possible implications the Iceberg Metaphor and related research may have for the creation, implementation, and evaluation of international educational computer conferences.

Key words

computer-mediated communication, qualitative research methodology, University of Michigan, preservice teacher education, case study, international educational computer conference

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I. Introduction

Internet conferencing technologies hold great potential for international education. Classrooms in different countries can share information, collaborate on projects, and learn from and about one another at their own pace and convenience. As the variety of telecommunications project options for educators expands, program planners are experimenting with various models upon which to base and evaluate their projects. This paper presents one such model that is the product of 13 years of computer-mediated communication (CMC) projects operated by the Interactive Communications & Simulations (ICS) group at the University of Michigan's School of Education.

The Interactive Communications & Simulations (ICS) group at the University of Michigan's School of Education launched its first computer-mediated simulation in the Spring of 1984. Since then, ICS has sponsored a number of educational simulations that attract participants from 27 U.S. states and 23 countries. ICS's first simulation, the Arab-Israeli Conflict (AIC), was adapted from a face-to-face simulation that had been conducted for ten years as part of an undergraduate political science course, and was moved on-line with the aid of the CONFER II computer conferencing system also developed at the University (Goodman, 1992; Katterman, 1990). Over the next twelve years, ICS has developed a number of simulations including the "United States Constitution Simulation" (Taylor, 1988), the "Space Forum," "Earth

Odysseys," English and French versions of the "International Poetry Guild," and the "World Forum" (Sugar and Banks, 1995).

II. ICS's Conceptual Framework of Educational CMC

1. The Iceberg Metaphor Defined

(1) ICS's conception of the nature of CMC interactions has come to be known as the "Iceberg Metaphor" or "Michigan model" (Scott, 1997; Scott, 1997, March; Scott, Espinosa, & Stanzler, 1997). This model provides an alternative way of developing, implementing, and research educational computer conferences. ICS conceptualizes the learning experience facilitated by educational telecommunications using an iceberg metaphor. That is, the on-line communication between participants in a simulation is seen as similar to the 10% of the iceberg that remains above the water's surface. The remaining 90% of the learning experience takes place through the face-to-face interactions of students and teachers nested in classrooms around the world; interactions that are *supplemented*, rather than *supplanted*, by the on-line communications. Of course, the actual percentages fluctuate for each group on any given day, but the importance of the face-to-face component of these exercises is key to our understanding of the nature of computer-mediated simulations.

2. The Iceberg Metaphor's Implications for CMC Practice and Evaluation

For project development, this model shapes ICS exercises in several ways:

- emphasis on student-generated artifacts,
- less directed, more open-ended student participation,
- emphasis on student-to-student communications, and
- scaffolding by ICS mentors for both students and teachers.

For project evaluation and research, this metaphor encourages us to shift our focus from participants' on-line discussions to their off-line engagement. This is key as the model's primary value is to call attention to the possibility that people who focus attention solely on the what is visible (i.e. the communications that take place on-line) may miss a potentially important source of information (i.e. interactions that take place off-line).

This shift in thinking about the nature of electronic communications influences the focus of evaluation away from analysis of the conference messages and towards such questions as:

1. How do participants, and especially *non-participants*, perceive the conference?
2. How do participants socially construct their engagement with the on-line discussion?
3. What off-line factors limit, or preclude, participants' engagement with the conference?

Such questions can best be answered by entering the participants' off-line world, and, using methods such as interviews and observations, trying to understand their perceptions of, and engagement with, the on-line

discussion. The use of these methods is essential to understand the perspective of those potential discussion members who are unable, or unwilling, to participate in the conference. Analysis limited to on-line discourse runs the risk of overstating the discussions' benefits as it only accounts for those participants who posted messages and misses "lurkers" and non-participants. Including such participants in an analysis of computer-mediated discussions is of critical importance since their perspectives provide a more balanced view of these technologies' benefits and limitations. Such a view may lead to the development of new discussion formats that could increase the participants' learning experience.

It is worth noting that this shift in focus, from on-line discussion to individual participant's engagement, does not eliminate the need for analyzing the on-line discourse. Indeed, the on-line discourse provides important insight into connections among the learners participating in the conference. To link this back to the iceberg model, the goal of such research is to make more of the iceberg visible by bringing to light the perceptions of, and engagement with, computer conferencing. This type of investigation is useful both to enhance our understanding of how these technologies are used, and to inform the development of more appropriate on-line discussion formats that take into account the actual use of the technology, and perhaps to suggest ways for improving off-line interactions.

III. The Iceberg Metaphor's Influence on Current Research: Preservice Teachers' use of a Computer Conference

1. The Program

This study, conducted as part of the author's doctoral research, examined the nature of preservice teachers' perspectives on, engagement with, and use of a computer conference during a one-year graduate-level teacher certification program (Scott, 1997). The interns who participated in this conference were enrolled in the Master of Arts with Certification (MAC) program which is an intensive, one-year, graduate-level, teacher certification program in the School of Education at the University of Michigan. 31 preservice teachers were originally enrolled in the program and 16 of these individuals were interviewed for the study.

2. The Conference

A computer conference was created and made available to the interns in the MAC program. The conference was run on a Unix-based server at the School of Education. The conference software was a modified version of the World Wide Web-based freeware, "HyperNews." HyperNews allows for multiple threaded discussions, hyperlinks to other Web sites, and the inclusion of images, video, and audio. This conference was password protected to prevent unauthorized access. Like all University of Michigan students, interns were given free Internet accounts and, in addition, were

given a tutorial on telecommunications at the University in general and on the MAC conference in particular.

The interns were originally assigned to participate in the conference at least twice each week as part of their program participation grade. After two months, however, several interns questioned this policy and the faculty agreed to remove the requirement while still encouraging intern participation in the conference. This change was well received by some participants as is detailed below.

3. The Participants

Of the 16 participants interviewed for this study, eight were selected as the focus of this case study. These interns were selected to cover a range of conference use, from heavy users to light or non-users. Table 1 presents the participants, categories, and conference use based on number of messages sent.

Table 1

Selected Interns' Conference Participation by Term

Intern	Total Messages Posted by Semester		
	Summer	Fall	User Type
Student A	21	30	Heavy
Student B	17	12	Heavy
Student C	13	18	Heavy
Student D	7	4	Moderate
Student E	5	15	Moderate
Student F	4	7[2]	Moderate
Student G	1	0	Light
Student H	1	0	Light

Note. For the purposes of this table, "participation" is defined as the number of messages posted to a conference. More generally in this study, however, participation included "lurkers," interns who read the conference, but did not post messages. This latter form of engagement relies on anecdotal accounts since the conference software was unable to record who accessed the conference but did not submit a message. This is one drawback to the current software which deserves greater attention in future.

4. The Study

At the outset, this study was guided by the question, "What is the role of a computer conference when the participants have the opportunity to interact face-to-face?" The MAC interns meet seminars at least two times each week, and many interacted on a face-to-face basis everyday. With so many chances to speak with their colleagues, I wondered why and how they would use a computer conference. During the course of the study, this fundamental question broke down into several more specific questions:

- What is the nature of preservice teachers' use of the MAC conference? What factors encouraged or limited their participation in the conference? What benefits or costs did they encounter as a result of their participation?
- What is the nature of preservice teachers' non-use of the MAC conference? What kinds of factors limited their participation in the conference (e.g. technological, interpersonal, other)?
- How do the interns compare the relative merits of their face-to-face seminars versus the electronic conference? What kinds of discussions do they believe are better suited to each forum?
- What connections, if any, do they perceive between the electronic discussion and in-class discussions?

These lines of questions remained throughout the study. In the final analysis, the study focused on the perceptions of ownership and how it found expression in two arenas: The MAC computer conference and the face-to-face seminar. These areas are discussed in greater detail below.

5. Data Collection

This study was primarily influenced by naturalistic inquiry methods (Lincoln & Guba, 1985), and used several research techniques to get a "behind the scenes" look at the participants' perceptions of, and engagement with, this computer conference. Initially, I conducted a series of interviews (Mishler, 1986; McCracken, 1988) with the interns to better understand their perceptions of computer-mediated communications in general, the MAC conference in particular, and the relative merits of computer-mediated versus face-to-face

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[22] Voluntarily left the program near the end of the Fall semester for reasons unrelated to the conference or this study.

discussions as part of their professional development program. These interviews were transcribed and analyzed, in part, using Spradley's ethnographic interviewing methods (Spradley, 1979). Little, if any, research in the area of CMC use by preservice teachers provides detailed accounts by the interns themselves. This study attempts to bring the interns' "voices" to the forefront by including extensive transcript sections from the interviews to illustrate the various points being made.

At the beginning of each interview, the interns completed a short survey which was used to obtain common points of information for all interviewees, and to supplement and develop the established interview protocols. Other data collection methods included informal discussions and e-mail correspondence with the interns to facilitate discussion with them between formal interviews. Information gained through these informal discussions provided valuable information about the interns' current thinking about the conference, and helped shape subsequent interviews.

6. Findings

One of the main findings was the participants' perception of ownership over the conference. Many participants felt the in-class seminars were controlled by the faculty whereas they controlled the conference (i.e. no assigned discussions, faculty presence was minimal, and they could initiate discussion on any topic). The conference provided a forum where the interns

could direct their education with an appropriate amount of support, and lack of interference, from the faculty. This perception of conference ownership seems to primarily derive from the way both the seminar and the computer conference were structured by the faculty, and not from any inherent traits of computer-mediated communications. Thus, the participants' views speak as much to the nature of the face-to-face seminars as they do to the conference itself, and to the need to continuously assess the contributions of both as well as the interactions between the two environments.

Interestingly, interns' perceived control of the conference did not produce a discussion space where all participants felt free to speak without fear of being judged negatively by their peers or even by faculty who might observe their work. The interns' approach to composing and posting their messages was telling. One heavy user would only post her reflection paper if she thought she "said something well," and that she used proper sentence structure (i.e. not writing in all lower case letters as she might in personal correspondence). Other interns also acknowledged that they edited their conference submissions. For one light user, it was to avoid being thought "stupid," whereas for another heavy user, it was a matter of professionalism and respect.

Numerous advantages of the conference were described. These benefits included:

1. Enhanced reflection and thoughtfulness

Greater reflection and thoughtfulness were afforded by the asynchronous nature of the electronic forum. Participants had more time to think about the messages they read, and gave them more time to compose their responses. These characteristics contributed, in part, to some interns' assessment that the conference might be a better forum for sensitive or controversial topics than the face-to-face seminar.

2. Always available

The conference was available 24 hours a day which enabled participants to contribute whenever it was convenient, even when they were "feeling brilliant at 2 a.m." The electronic discussion also freed the interns from the linear structure of in-class discussions. They could revisit past discussions if necessary, and respond to the messages in any order they wished.

3. Advantages over face-to-face discussions

Some interns felt that it was *easier to speak in the conference than in class*. However this potential was unrealized by self-proclaimed shy interns; One light user felt that the conference did not offer sufficient incentive to participate, while another was concerned about her ability to articulate her thoughts in writing inhibited her conference participation. This last comment is interesting as it comes from a native English speaker. I can imagine non-native English speakers participating in an English-language conference sharing similar concerns.

IV. Implications for International Educational Computer Conferences

The previous sections presented one conceptual model for the creation and evaluation of educational CMC environments, and one example of how this model was used to research participant engagement with such a conference. This section will present several implications these examples have for international conferences.

All Interactive Communication & Simulation (ICS) exercises are international in the sense that the participants live in different countries. However, nearly all of these participants attend English-based schools and the conferences take place in English (the exception being the French language version of the International Poetry Guild). However, the iceberg model seems to hold some promise for bi- or multi-lingual educational computer conferences.

1. In-class program planning is crucial.

The metaphor suggests that the bulk of conference participant learning takes place off-line. Thus program planners might take into consideration that not everything they hope to achieve can happen in the conference itself. Important learning opportunities can and should be fostered in the classroom, possibly through small-group work. It is easy to conceive of a productive conference in English where the non-native speakers participate

as a small group rather than as individuals. Such a collaborative scheme would take pressure off individual participants and potentially foster skill development. Individual participation could be either optional, or a goal to establish for subsequent programs.

2. Asynchronous conferences provide valuable time for international participants.

The MAC program research presented above suggests that native English speakers benefited in at least two ways from asynchronous conferencing: 1) the ability to reread messages and take time to compose their responses, and, 2) the ability to participate in the conference at any time. It is easy to imagine similar benefits for non-native speakers engaged in another language. Students with a modest grasp of the target language would have additional time to read through the conference messages and compose their own messages. An additional benefit that derives from closely from ICS exercises is the ability for classes in different countries to participate in the conference despite differences in time zones.

3. Multiple conversations fosters participant choice and control.

While this is not unique to the MAC conference, the participants in that study did mention that CMC allowed them to break free of the linear format of in-class discussions. Part of their control over the conference was the ability to engage in whatever conversation interested them. Extending

similar control to non-native speakers could allow them to select the discussion(s) in which they are most comfortable participating.

4. Non-user focus.

One of the iceberg model's implications for CMC project evaluation is the ability to learn from non-users. This was the case in the MAC study where light and non-users of the conference were interviewed. Aoki (1995) presents a detailed description of Japanese CMC communities in which she defines two major types of conference participants: ROMs and RAMs.

> In Japanese online communities, people who read messages in computer conferences but do not usually post are called ROM, or Read Only Members, the equivalent of "lurkers" in the U.S. Those who actively participate in the conferences are called RAM, for Random Access Members or Radical Active Members. One study showed that 83% of the people who subscribed to a conference had never "spoken," and among those who had spoken at least once, two-thirds had posted less than three messages (Kawakami, 1993). In computer conferences, it is usually true that a few people speak a lot while the majority only "listen."

This distinction becomes salient for this discussion when Aoki presents Kawakami's six reason why more conference participants are ROMs rather than RAMs:

1. reluctance to speak to strangers;
2. reluctance to participate in a group that has formed and developed without them;
3. lack of expertise in participating and fear of being evaluated by others;
4. difficulty of deciding to what extent they should disclose themselves to others;

5. worry of not knowing how clearly they make themselves understood; and
6. fear of receiving criticism from others.

The findings of the MAC study indicate that Japanese ROMs are not alone in several of these characteristics, especially numbers 3, 4, 5, and 6 above. While there are undoubtedly different cultural forces shaping how Japanese and American ROMs would describe their concerns, that they share these concerns seems an important consideration in the development of international CMC projects and furthering research into the cultural components of how people engage with technology.

It is also seems important that, as the iceberg model implies, we focus on non-users of the conference. My experience agrees with Kawakami, that about two-thirds of conference participants post more than a couple of messages. Thus, I am less concerned about the active one-third as I am about the remaining silent members.

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